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Docket No. **AT9-99-469**

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Sir:

Transmitted herewith for filing is the patent application of Inventor(s):
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For: __METHOD AND APPARATUS FOR MAXIMIZING EFFICIENCY OF SMALL
DISPLAY IN A DATA PROCESSING SYSTEM__

Enclosed are also:

X 20 Pages of Specification including an Abstract
X 7 Pages of Claims
X 5 Sheet(s) of Drawings
X A Declaration and Power of Attorney
X Form PTO 1595 and assignment of the invention to IBM Corporation

CLAIMS AS FILED

FOR	Number Filed		Number Extra		Rate		Basic Fee ($760)
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METHOD AND APPARATUS FOR MAXIMIZING EFFICIENCY OF SMALL DISPLAY IN A DATA PROCESSING SYSTEM

BACKGROUND OF THE INVENTION

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1. Technical Field:

The present invention relates generally to an improved data processing system and, in particular, to a method and apparatus for maximizing efficiency of a small

10   display in a data processing system. Still more particularly, the present invention relates to a method and apparatus for displaying data and receiving input on a display in a data processing system.

15   ### 2. Description of Related Art:

The manipulation of data in a computer is well known in the prior art. Data may be manipulated in many ways in a modern state of the art computer including: data accessing, data encoding, data communications, data

20   compression, data conversion, data entry, data exchange, data filing, data linking, data locking, data mapping, data modeling, data processing, data recording, data sorting, and data transferring. The large amounts of data that are available to the user of a modern state of

25   the art computer often become overwhelming in magnitude and complexity. In providing an interface between a user and a computer, the use of a graphical user interface (GUI) provides an intuitive and graphical interface between the user and a computer. A GUI is an interface

30   system, by which a user interacts with a computer through windows or view ports, icons, menus, pointing devices,

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etc.

Although the use of GUIs has made the manipulation
of data easier for users in some instances, GUIs have
created new problems especially in different types of
5   computers. For example, pen-based or pen-aware computer
systems are becoming more common place. These computer
systems, also referred to as personal digital assistant
or hand held computers, are often housed in a relatively
flat enclosure in which the display assembly functions
10   both as an input device and an output device. When
operating as an input device, the display assembly senses
the position of the tip of a stylus on the viewing screen
and provides this positional information to the
computer's central processing unit. Some display
15   assemblies also are able to sense the pressure of the
stylus on the screen to provide further information to
the central processing unit. When operating as an output
device, the display assembly presents computer generated
images on the screen.
20   This dual function in pen-based computer system
permits a user to operate the computer as a computerized
notepad. As the computer senses the position and
movement of the stylus, the computer generates a
corresponding image on the screen to create the illusion
25   that the stylus is drawing the image directly on the
screen. With suitable recognition software, text and
numeric information also can be entered into the
pen-based computer in a similar fashion. Additionally,
these types of computers also may provide a number of
30   useful functions, such as serving as an address book, an
appointment calendar, and a to do list.
These types of computer systems, however, have a

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drawback when compared to more traditional computer
systems, such as a personal desktop computer. One
particular drawback is the size of the display. These
displays are relatively small and can display only
5 limited amounts of information. As a result, the amount
of display space for displaying data and receiving user
input is limited. If an input field is too small, a user
will be unable to manipulate a stylus sufficiently to
enter data. As a result, data entry may require
10 traversing several screens or windows. By doing so, the
logic or ease of use of an application may be reduced.

Therefore, it would be advantageous to have an
improved method and apparatus for displaying data and
receiving user input in a computer.
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SUMMARY OF THE INVENTION

The present invention provides a method and
5   apparatus in a data processing system for processing user
input. A graphical widget is displayed on a display
device within the data processing system, wherein the
graphical widget is displayed using a first size.
Responsive to receiving a selected user input, a display
10   of the graphical widget is resized on the display device
to a second size for receiving user input, wherein the
second size is larger than the first size.

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BRIEF DESCRIPTION OF THE DRAWINGS

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The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in

10 conjunction with the accompanying drawings, wherein:

Figure 1 is a diagram illustrating a computer in the form of a personal digital assistant depicted in which the processes of the present invention may be implemented;

15   **Figure 2** is a block diagram of a personal digital assistant depicted in accordance with a preferred embodiment of the present invention;

Figure 3 is a pictorial representation depicting a data processing system in which the present invention may

20 be implemented in accordance with a preferred embodiment of the present invention;

Figure 4 is a block diagram illustrating a data processing system in which the present invention may be implemented;

25   **Figures 5A** and **5B** are diagrams illustrating an example of a graphical widget depicted in accordance with a preferred embodiment of the present invention;

Figures 6A-6C are diagrams illustrating a graphical widget in the form of controls depicted in accordance

30 with a preferred embodiment of the present invention; and

Figure 7 is a flowchart of a process for handling

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input to a graphical widget depicted in accordance with a
preferred embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

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With reference now to the figures and, in
particular, with reference to **Figure 1**, a diagram
illustrating a computer in the form of a personal digital
assistant is depicted in which the processes of the
present invention may be implemented. Computer **100** is an
example of a personal digital assistant (PDA). PDA **100**

10
in the depicted examples is a portable personal computer
in which housing **102** includes a screen **104**. Screen **104**
in this example is a touch responsive screen including a
mechanism for selecting or designating a location on the
surface of screen **104** in response to a pointer being

15
placed on the surface of screen **104**. As used herein, a
reference to a "pointer" may be to either a stylus or a
graphical pointer manipulated by a pointing device, such
as a mouse or trackball.

Essentially, screen **104** comprises data panels placed

20
either on the display surface or between the user and the
display surface. Additionally, PDA **100** also provides
ports and connectors (not shown) for power and serial
access to its system board. Additionally, PDA **100** also
may include a mechanism to receive PC cards, such as a

25
modem or flash memory, for additional functionality.

Turning now to **Figure 2**, a block diagram of a
personal digital assistant is depicted in accordance with
a preferred embodiment of the present invention.
Personal digital assistant (PDA) **200** includes a

30
processing unit **202**, a read only memory (ROM) **204**, random
access memory (RAM) **206**, expansion ram **208**, input/output

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(I/O) circuitry **210**, and display **212**.   PDA **200** also may
optionally include a mass storage unit **214**, such as a
disk drive unit or a non-volatile memory such as a flash
memory and a real time clock **216**.

5   Processor **202** is preferably a commercially available
single chip microprocessor and preferably a complex
instruction set chip (CISC).   Of course, other types of
processors may be employed depending on the
implementation.   In this example, processor **202** is

10   coupled to ROM **204** by a data bus **218**, a control bus **220**,
and an address bus **222**.   ROM **204** contains the basic
operating system for PDA **200** in these examples.
Processor **202** is also connected to RAM by data bus **218**,
control bus **220**, and address bus **222** to permit the use of

15   RAM **206** as a scratch pad or storage for data. RAM **208** is
optionally coupled to RAM **206** for use by processor **202**.
Processor **202** also is coupled to I/O circuitry **210** by
data bus **218**, control bus **220**, and address bus **222** to
permit data transfers with peripheral devices.

20   I/O circuitry **210** typically includes the number of
latches, registers, and direct memory access (DMA)
controllers.   The purpose of I/O circuitry **210** is to
provide an interface between processor **202** and peripheral
devices, such as display assembly **212** and mass storage

25   unit **214**.

         Display assembly **212** in PDA **200** is both an input and
output device in these examples.   Accordingly, display
assembly **212** is connected to I/O circuitry **210** by a
bi-directional data bus **218**.   Operating as an output

30   device, display assembly **212** receives data from I/O

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circuitry **210** via data bus **218** and displays that data on a suitable screen. The screen for display assembly **212** is, in these examples, a liquid crystal display (LCD). The input device of display assembly **212** can be a thin,

5   clear membrane covering the LCD display and which is sensitive to the position of a stylus, such as stylus **226** on its surface. Alternatively, the screens may be provided with an embedded radio frequency (RF) digitizer and an "active" RF stylus. Of course, other types of

10   combinations of screen/tablet technologies may be employed.

Additionally, other types of user inputs may be used in conjunction with the present invention. While the processes are described with reference to the context of

15   a pen system, other types of pointing devices may benefit from the processes of the present invention. These types of pointing devices include, for example, a mouse, a trackball, or a tablet to manipulate a pointer displayed on the screen.

20   A mass storage device, such as mass storage unit **214**, is generally desirable, but may be eliminated by providing a sufficient amount of RAM **206** and expansion RAM **208** to store user application programs and data. In such a case, RAM **206** and RAM **208** may be provided with a

25   backup battery to prevent loss of data even when PDA **200** is turned off. It is generally desirable, however, to have an additional mechanism for long term storage, such as mass storage unit **214**. Mass storage unit **214** may take different forms, such as, for example, a miniature hard

30   disk drive, or some other non-volatile memory, such as, for example, a flash memory, a battery backed RAM, or a

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PC data card.

　　　　In operation, information is entered into PDA **200** by a user manipulating stylus **226** to "write" on the screen of display assembly **212**. Information concerning the

5   location of stylus **226** is sent to processor **202** via I/O circuitry **210**. Typically, this information comprises cartesian coordinates of a pixel of the screen display assembly **212** over which the tip of stylus **226** is positioned. Processor **202** processes the data under the

10   control of an operating system and possibly an application program stored in ROM **204** or in RAM **206** and RAM **208**. Data may be produced in response to this user input by processor **202**, which is then output on display **212**.

15   　　　　Additionally, expansion bus **228** is coupled to data bus **218**, control bus **220**, and address bus **222**. In this manner, expansion bus **228** may provide extra ports to couple devices, such as a modem, a display switch, a microphone and a speaker to processor **202**.

20   　　　　With reference now to the **Figures 3** and **4**, in particular, with reference to **Figure 3**, a pictorial representation of a data processing system is shown in which the present invention may be implemented in accordance with a preferred embodiment of the present

25   invention. A personal computer **300** is depicted which includes a system unit **310**, a video display terminal **302**, a keyboard **304**, storage devices **308**, which may include floppy drives and other types of permanent and removable storage media, and mouse **306**. Additional input devices

30   may be included with personal computer **300**. Personal

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computer **300** can be implemented using any suitable
computer, such as an IBM Aptiva™ computer, a product of
International Business Machines Corporation, located in
Armonk, New York. Although the depicted representation

5   shows a personal computer, other embodiments of the
present invention may be implemented in other types of
data processing systems, such as network computers, Web
based television set top boxes, Internet appliances, etc.
Computer **300** also preferably includes a graphical user

10 interface that may be implemented by means of systems
software residing in computer readable media in operation
within computer **300**.

   With reference now to **Figure 4**, a block diagram
illustrates a data processing system in which the present

15 invention may be implemented. Data processing system **400**
is an example of a computer, such as computer **300** in
Figure 3, in which code or instructions implementing the
processes of the present invention may be located. Data
processing system **400** employs a peripheral component

20 interconnect (PCI) local bus architecture. Although the
depicted example employs a PCI bus, other bus
architectures such as Micro Channel and Industry Standard
Architecture (ISA) may be used. Processor **402** and main
memory **404** are connected to PCI local bus **406** through PCI

25 bridge **408**. PCI bridge **408** also may include an integrated
memory controller and cache memory for processor **402**.

   Additional connections to PCI local bus **406** may be
made through direct component interconnection or through
add-in boards. In the depicted example, local area

30 network (LAN) adapter **410**, small computer system interface
SCSI host bus adapter **412**, and expansion bus interface **414**

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are connected to PCI local bus **406** by direct component

connection. In contrast, audio adapter **416**, graphics

adapter **418**, and audio/video adapter **419** are connected to

PCI local bus **406** by add-in boards inserted into expansion

5   slots. Expansion bus interface **414** provides a connection

for a keyboard and mouse adapter **420**, modem **422**, and

additional memory **424**. SCSI host bus adapter **412** provides

a connection for hard disk drive **426**, tape drive **428**, and

CD-ROM drive **430**. Typical PCI local bus implementations

10   will support three or four PCI expansion slots or add-in

connectors.

An operating system runs on processor **402** and is used

to coordinate and provide control of various components

within data processing system **400** in **Figure 4**. The

15   operating system may be a commercially available operating

system such as OS/2, which is available from International

Business Machines Corporation. "OS/2" is a trademark of

International Business Machines Corporation. An object

oriented programming system such as Java may run in

20   conjunction with the operating system and provides calls

to the operating system from Java programs or applications

executing on data processing system **400**. "Java" is a

trademark of Sun Microsystems, Inc. Instructions for the

operating system, the object-oriented operating system,

25   and applications or programs are located on storage

devices, such as hard disk drive **426**, and may be loaded

into main memory **404** for execution by processor **402.**

Those of ordinary skill in the art will appreciate

that the hardware in **Figure 4** may vary depending on the

30   implementation. Other internal hardware or peripheral

devices, such as flash ROM (or equivalent nonvolatile

memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 4**. Also, the processes of the present invention may be applied to a multiprocessor data processing
5   system.

     The depicted example in **Figure 4** and above-described examples are not meant to imply architectural limitations. For example, data processing system **400** also may be a notebook computer or hand held computer. Data
10   processing system **400** also may be a kiosk or a Web appliance.

     Within a PDA, such as PDA **200** in **Figure 2** or a computer, such as computer **300** in **Figure 3**, the present invention provides a method, apparatus, and computer
15   implemented instructions for maximizing the efficiency of available display space. The mechanism of the present invention may be used as an add on or hookup to existing window manager systems or function independently in the absence of a window manager. The mechanism of the
20   present invention provides graphical widgets displayed on a screen. A graphical widget is a graphical input mechanism that can be resized to allow easier user input. Input may be received by the graphical widget in its reduced form, but is more difficult. These graphical
25   widgets are displayed in a predefined size and layout in these examples. These graphical widgets are small in size and not typically suitable for user input, but when selected or tapped, a graphical widget will increase or grow in size to a preprogrammed percentage of the size of
30   the screen and display a small "return" or "get back" graphical widget. This return widget is used to return

the graphical widget to its original size.
Alternatively, instead of selecting a return widget, the
user may reselect the graphical widget to cause the
graphical widget to be resized to the original size.

5   Also, instead of increasing the size of the widget
to preprogrammed percentage of the screen, the widget may
be increased in size to a selected size and layout. When
in its expanded form, the graphical widget is of a size
that allows the user to input data using a stylus.

10   Further, the size may be of one that allows the user to
be able to see text being entered. When the return
widget is selected, the graphical widget is returned to
its original size and layout. This return widget may be
a graphical object, such as, for example, a small button

15   displayed in association with the graphical widget.
Otherwise, the processes of the graphical widget provide
behavior as normally found in a typical window or other
field for data entry.

        For example, a user of a PDA desires to fill in a

20   name and number in a contact list. The user may tap a
name test field, which is a graphical widget, with a
stylus. In response, the graphical widget will increase
in size such that the user can more easily enter the
name. When the user is finished, the user may select the

25   return widget and have the name text field return to its
original size and layout. In this manner, many fields
for input may be placed on small screens, but still allow
a user to easily interact with these graphical widgets.
This mechanism allows a number of different input fields

30   and controls to be displayed on a screen to allow a user
to select from those input fields and controls without
having to diverse multiple windows. Alternatively, the

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number of windows needing to be used may be reduced.

With reference now to **Figures 5A** and **5B**, diagrams illustrating an example of a graphical widget are depicted in accordance with a preferred embodiment of the

5   present invention. In **Figure 5A**, display **500** includes small text field **502** and small text field **504**. Additionally, display **500** also includes a radio button **506** and a radio button **508**. In these examples, small text field **502** and small text field **504** are graphical

10 widgets, which may be resized to allow for easier user input through pointer **510**.

By selecting or tapping small text field **504** using pointer **510**, small text field **504** expands to form text field **512** as shown in **Figure 5B**. Text field **512** allows

15 for a user to more easily input data. Text field **512** may be reduced back to small text field **504** by selecting return widget **514** using pointer **510**. Alternatively, a selection of text field **512** may cause a return to the display of small text field **504** depending on the

20 implementation. In the depicted examples, text could be entered by user into text field **504**, but the size of text field **504** makes such entry difficult for a user. By having text field **504** "grow" or "snap" to the size for text field **512**, a user is more easily able to enter data.

25 Selection of small text field **504** results in a focus causing small text field to snap or grow on the screen to a "preferred" size as illustrated by text field **512**. The snap or growth may be in an animated fashion such that the use can easily track the field.

30   With reference now to **Figures 6A-6C**, diagrams

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illustrating a graphical widget in the form of controls,
are depicted in accordance with a preferred embodiment of
the present invention.   In **Figure 6A**, display **600**
includes a display control **602**, and audio control **604**,

5   and a selection field **606**.   In this example, display
control **602**, and audio control **604** are graphical widgets
in accordance with a preferred embodiment of the present
invention.   Selection of one of these graphical widgets,
such as display control **602** using pointer **608** results in

10   display **602** growing in size to present display control
610 in **Figure 6B** in which a user may make various
selections.   For example, the user may select window
button **612** or screen button **614** to adjust display **600**.
Additionally, the display size may be adjusted using

15   slider **616** along scroll bar **618**.   Another selection of
display control **610** results in the graphical widget
returning to its original size as illustrated by display
control **602** in **Figure 6A**.   Similarly, selection of audio
control **604** in **Figure 6A** results in audio control **620**

20   being displayed in **Figure 6C**.   In this example, the audio
may be set to "stereo" by selection of button **622** or to
"mono" by selection of button **624**.   The volume may be
adjusted by manipulating slider **626** in scroll bar **628**
using pointer **608**.

25   In these examples, display control **610** and audio
control **620** are enlarged versions of display control **602**
and audio control **604** in which the controls are increased
in size by some selected percentage. Although the user
could manipulate display control **602** or audio control **604**

30   in its reduced size, the resized versions, display

control **610** and audio control **620**, allow for easier
manipulation by a user when display space is limited.
This proportional change allows a user to easily track
control as it changes size. The size of display control

5   **610** and audio control **620** are selected such that a user
may more easily manipulate the controls.

With reference now to **Figure 7**, a flowchart of a
process for handling input to a graphical widget is
depicted in accordance with a preferred embodiment of the

10   present invention. These processes may be implemented as
an add on to a window managing system. Alternatively,
the processes may be implemented in a single unified
window manager in an operating system.

The process begins by receiving user input (step

15   **700**). Thereafter, a determination is made as to whether
the user input is a focus event (step **702**). If the user
input is not a focus event, the input is processed (step
704) with the process then returning to step **700**.
Otherwise, if the user input is a focus event, a

20   preferred size is identified for the graphical widget
(step **706**). In the depicted examples, this preferred
size is some percentage of the original size of the
graphical widget. The exact percentage change is
determined based on the available display area and the

25   size needed for a user to easily input data into the
graphical widget. After the preferred size is
identified, the graphical widget is resized (step **708**)
and the screen is painted with the resized graphical
widget (step **710**). Of course, the repainting may include

30   an animation to show the "growth" or "snapping" of the
graphical widget from the original size to the new size.

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Thereafter, the process receives user input to the display(step **712**). Upon receiving user input, a determination is made as to whether the input is a size trigger event that returns the graphical widget to the

5   original size (step **714**). If the user input is not one to return the graphical widget to the original size, the user input is processed (step **716**) with the process then returning to step **712**. Otherwise, the graphical widget is resized to the original size (step **718**). Then, the

10   screen on the display is repainted with the resized graphical widget (step **720**) with the process then returning to step **700** as described above.

In the depicted examples, in resizing the widget to a preferred size, the resize or return widget may be

15   optionally displayed in association with widget to return the size trigger event. Alternatively, the size trigger event may be caused by a reselection of the graphical widget by the user.

It is important to note that while the present

20   invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions

25   and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media such a floppy disc, a hard

30   disk drive, a RAM, and CD-ROMs and transmission-type media such as digital and analog communications links.

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The description of the present invention has been
presented for purposes of illustration and description,
but is not intended to be exhaustive or limited to the
invention in the form disclosed. Many modifications and
5   variations will be apparent to those of ordinary skill in
the art.   For example, the processes of the present
invention may be applied to provide graphical widgets for
use in other types of data processing systems, such as,
for example, a digital versatile disk (DVD) player system
10   in which menus are displayed to a user on a screen, such
as a television.   In such a system, various fields may be
presented using graphical widgets in which a pointer
controlled by a remote control for the DVD player may be
used to input and select information for use in
15   controlling the DVD player.   The embodiment was chosen
and described in order to best explain the principles of
the invention, the practical application, and to enable
others of ordinary skill in the art to understand the
invention for various embodiments with various
20   modifications as are suited to the particular use
contemplated.

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CLAIMS:

What is claimed is:

5   1.   A method in a data processing system for processing
user input, the method comprising the data processing
system implemented steps of:
displaying a graphical widget on a display device
within the data processing system, wherein the graphical
10   widget is displayed using a first size; and
responsive to receiving a selected user input,
resizing a display of the graphical widget on the display
device to a second size for receiving user input, wherein
the second size is larger than the first size.

15

2.   The method of claim 1, wherein the selected user
input is a first selected user input and further
comprising:
responsive to receiving a second selected user
20   input, resizing the display of the graphical widget on
the display device to the first size.

3.   The method of claim 1, wherein the second size is a
percentage of the first size.

25

4.   The method of claim 1, wherein the graphical widget
is a text field for receiving user input.

5.   The method of claim 1, wherein the graphical widget
30   is a graphical control.

6.   The method of claim 1, wherein the data processing

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system is a personal digital assistant.

7.   The method of claim 1, wherein the data processing
system is a personal computer.

8.   The method of claim 1, wherein the data processing
system is a laptop computer.

9.   The method of claim 1, wherein the graphical widget
is a first graphical widget and further comprising:
      displaying a second graphical widget in association
with the first graphical widget; and
      responsive to receiving a user input on the second
graphical widget, resizing the display of the first
graphical widget on the display device to the first size
and removing the second graphical widget from the display
device.

10.   A method in a data processing system for processing
user input, the method comprising the data processing
system implemented steps of:
      displaying an input field in a display in the data
processing system, wherein the input field has a first
size; and
      resizing the input field on the display to a second
size in response to a user input requiring a resizing of
the input field, wherein the second size is larger than
the first size.

11.   The method of claim 10 further comprising:
      receiving additional user input in the input field.

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12.   The method of claim 10, wherein the user input is a
first user input and further comprising:
        responsive to a user input, resizing the input field
to the first size on the display.

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13.   The method of claim 10, wherein the data processing
system is a personal digital assistant.

14.   The method of claim 10, wherein the data processing
10   system is a portable computer.

15.   The method of claim 10 further comprising:
        displaying a graphical object in association with
the input field; and
15   responsive to receiving a user input on the
graphical object, resizing the display of the graphical
object on the display to the first size and removing the
graphical object from the display.

20   16.   A data processing system for processing user input,
the data processing system comprising:
        displaying means for displaying a graphical widget
on a display device within the data processing system,
wherein the graphical widget is displayed using a first
25   size; and
        first resizing means, responsive to receiving a
selected user input, for resizing a display of the
graphical widget on the display device to a second size
for receiving user input, wherein the second size is
30   larger than the first size.

17.   The data processing system of claim 16, wherein the

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selected user input is a first selected user input and
further comprising:

    second resizing means, responsive to receiving a
second selected user input, for resizing the display of
5   the graphical widget on the display device to the first
size.

18.   The data processing system of claim 16, wherein the
second size is a percentage of the first size.
10

19.   The data processing system of claim 16, wherein the
graphical widget is a text field for receiving user
input.

15   20.   The data processing system of claim 16, wherein the
graphical widget is a graphical control.

21.   The data processing system of claim 16, wherein the
data processing system is a personal digital assistant.
20

22.   The data processing system of claim 16, wherein the
data processing system is a personal computer.

23.   The data processing system of claim 16, wherein the
25   data processing system is a laptop computer.

24.   The data processing system of claim 16, wherein the
graphical widget is a first graphical widget and further
comprising:
30   displaying means for displaying a second graphical
widget in association with the first graphical widget;
and

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resizing means, responsive to receiving a user input
on the second graphical widget, for resizing the display
of the first graphical widget on the display device to
the first size and removing the second graphical widget
5   from the display device.

25.   A data processing system for processing user input,
the data processing system comprising:
displaying means for displaying an input field in a
10   display in the data processing system, wherein the input
field has a first size; and
resizing means for resizing the input field on the
display to a second size in response to a user input
requiring a resizing of the input field, wherein the
15   second size is larger than the first size.

26.   The data processing system of claim 25 further
comprising:
receiving means for receiving additional user input
20   in the input field.

27.   The data processing system of claim 25, wherein the
user input is a first user input and further comprising:
resizing means, responsive to a user input, for
25   resizing the input field to the first size on the
display.

28.   The data processing system of claim 25, wherein the
data processing system is a personal digital assistant.
30

29.   The data processing system of claim 25, wherein the
data processing system is a portable computer.

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30.   The data processing system of claim 25 further
comprising:
       displaying means for displaying a graphical object
5   in association with the input field; and
       resizing means, responsive to receiving a user input
on the graphical object, for resizing the display of the
graphical object on the display to the first size and
removing the graphical object from the display.
10

31.   A computer program product in a computer readable
medium for processing user input, the computer program
product comprising:
       first instructions for displaying a graphical widget
15   on a display device within the data processing system,
wherein the graphical widget is displayed using a first
size; and
       second instructions, responsive to receiving a
selected user input, for resizing a display of the
20   graphical widget on the display device to a second size
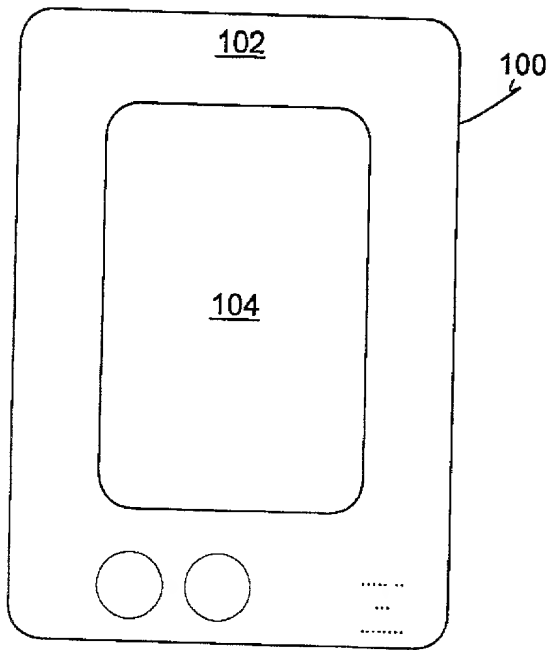for receiving user input, wherein the second size is
larger than the first size.

32.   A computer program product in a computer readable
25   medium for processing user input, the computer program
product comprising:
       first instructions for displaying an input field in
a display in the data processing system, wherein the
input field has a first size; and
30   second instructions for resizing the input field to
a second size in response to a user input requiring a
resizing of the input field, wherein the second size is

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larger than the first size.

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ABSTRACT OF THE DISCLOSURE

5   **METHOD AND APPARATUS FOR MAXIMIZING EFFICIENCY OF SMALL
DISPLAY IN A DATA PROCESSING SYSTEM**

A method and apparatus in a data processing system
for processing user input. A graphical widget is
10   displayed on a display device within the data processing
system, wherein the graphical widget is displayed using a
first size. Responsive to receiving a selected user
input, a display of the graphical widget is resized on
the display device to a second size for receiving user
15   input, wherein the second size is larger than the first
size.

Figure 1
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102

100

104
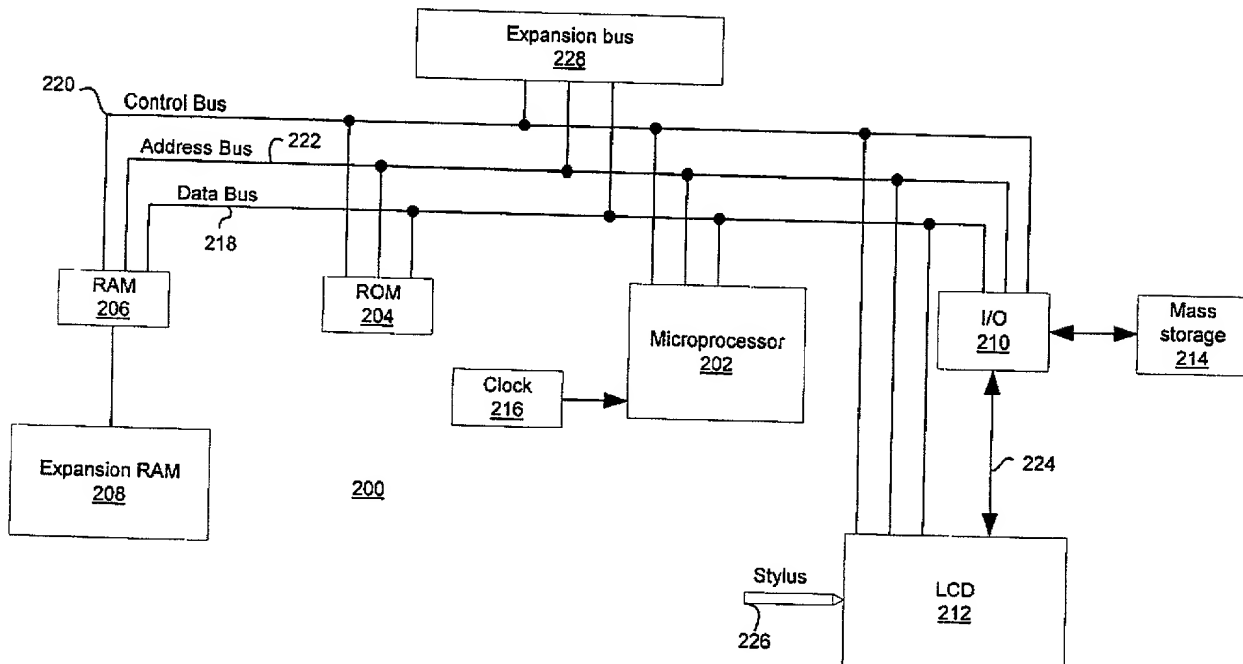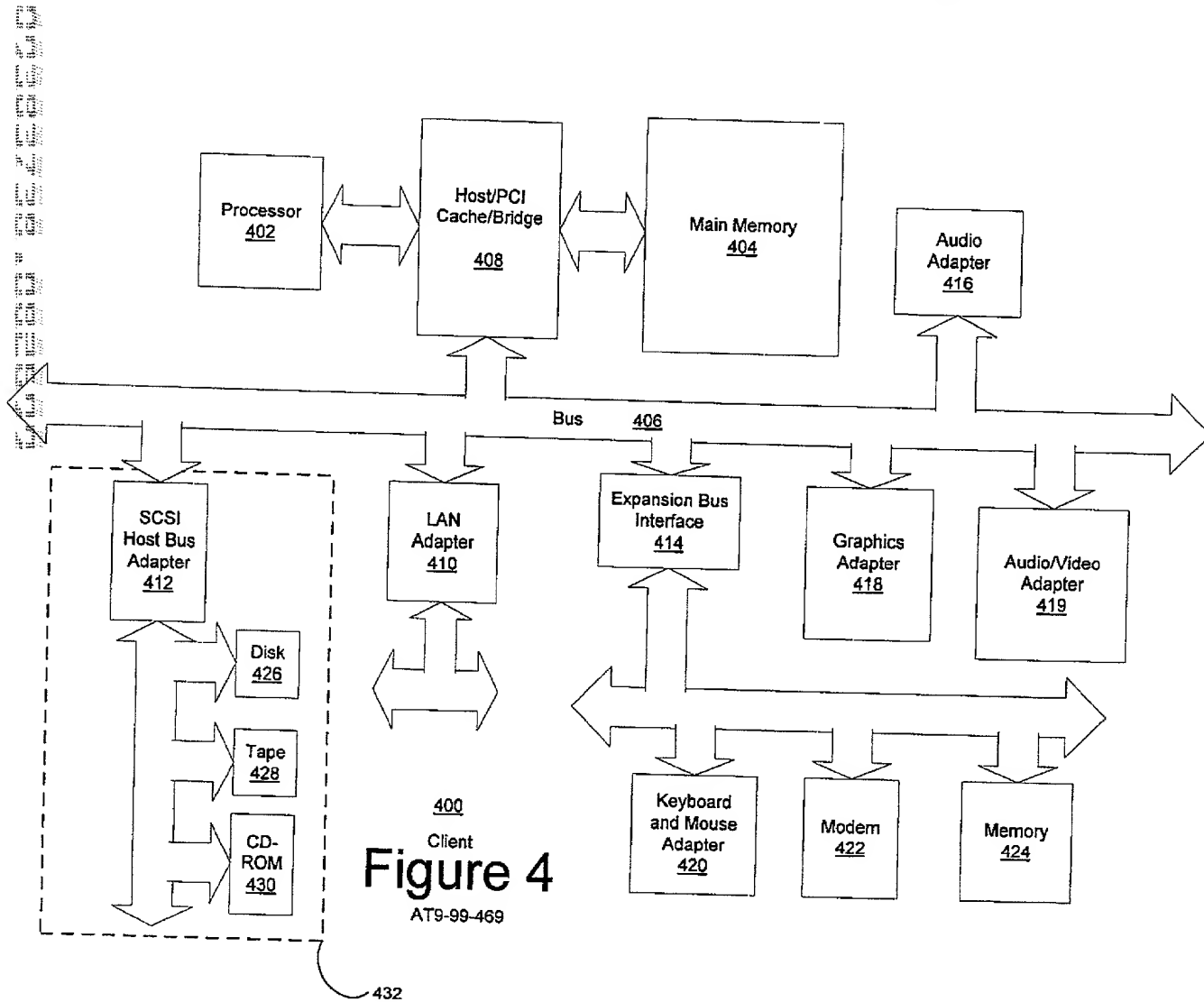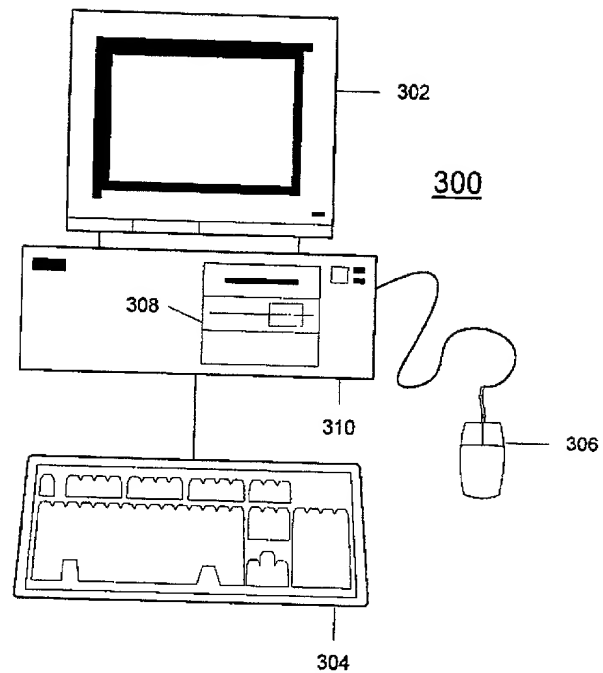
Figure 2
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Expansion bus
228

220 — Control Bus

Address Bus — 222

Data Bus

218

RAM
206

ROM
204

Microprocessor
202

I/O
210

Mass storage
214

Clock
216

Expansion RAM
208

200

224

Stylus

LCD
212

226

Figure 3

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302

300

308

310

306

304

Figure 4

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| Processor 402 |
| Host/PCI Cache/Bridge 408 |
| Main Memory 404 |
| Audio Adapter 416 |

Bus   406

| SCSI Host Bus Adapter 412 |
| LAN Adapter 410 |
| Expansion Bus Interface 414 |
| Graphics Adapter 418 |
| Audio/Video Adapter 419 |

Disk 426

Tape 428

CD-ROM 430

400

Client

Keyboard and Mouse Adapter 420

Modem 422

Memory 424

432

Figure 5A
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Figure 5B
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Figure 6A
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602
Display

604
Audio

608

606 Selection

600

Figure 6B
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612
Window

614
Full screen

616 610

618

240 480 640

606 Selection

608

600

Figure 6C
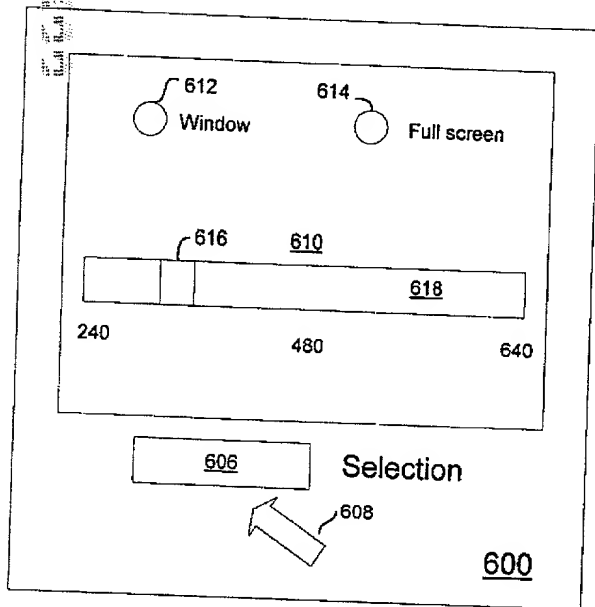AT9-99-469

602

622
Stereo

624
Mono
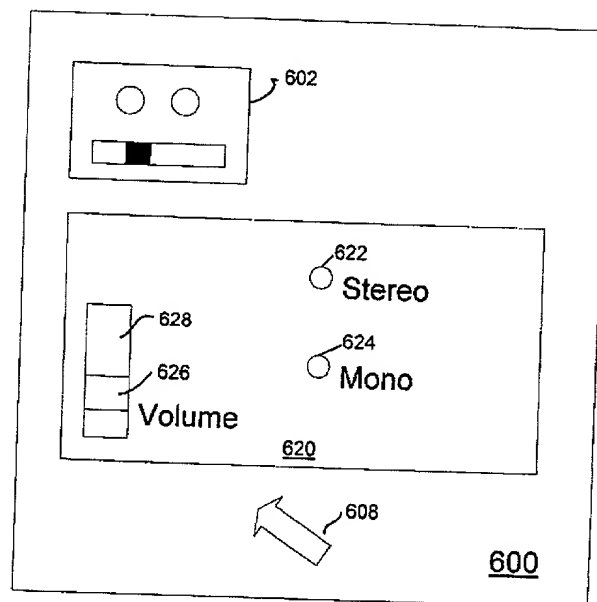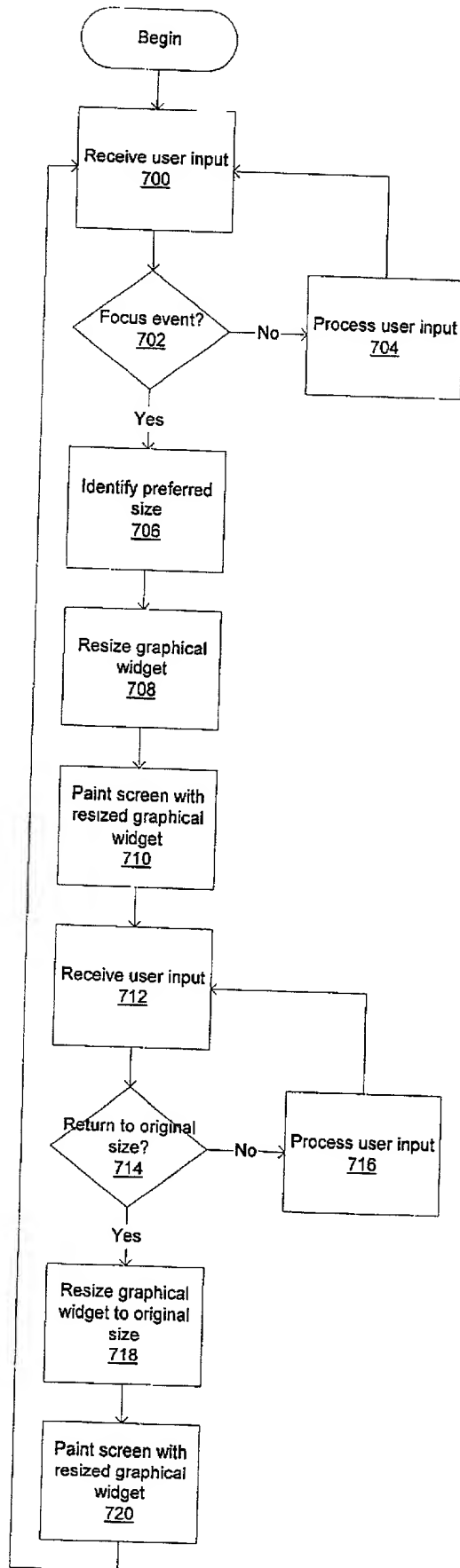
628
626
Volume

620

608

600
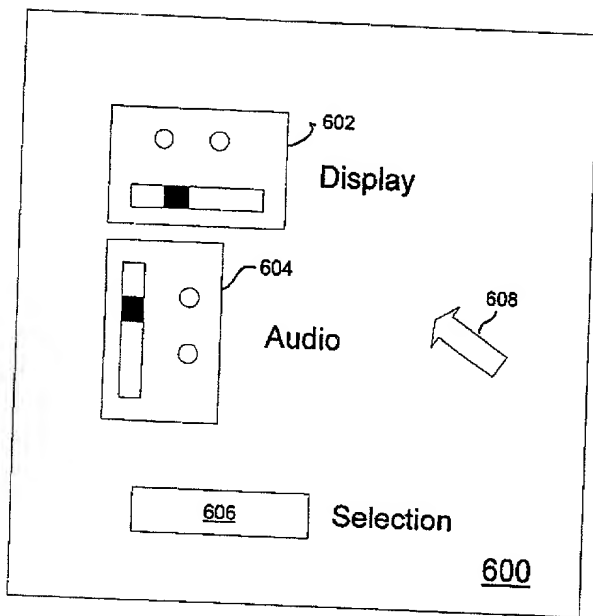
Figure 7
AT9-99-469

DECLARATION AND POWER OF ATTORNEY FOR

PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR MAXIMIZING EFFICIENCY OF SMALL DISPLAY IN A DATA PROCESSING SYSTEM

the specification of which (check one)

X is attached hereto.

__ was filed on _____
as Application Serial No._____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):   Priority Claimed

                                                        ____ Yes____ No
_____   _____   _____
   (Number)   (Country)   (Day/Month/Year)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

_____   _____   _____

(Application Serial #)   (Filing Date)   (Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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